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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/777,427

02/12/2004

Thomas Poschmann

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EXAMINER

WALKER, KEITH D

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

09/17/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/777,427	<b>Applicant(s)</b> POSCHMANN ET AL.	
	<b>Examiner</b> KEITH WALKER	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 11-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 11-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/4/08</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/4/08 has been entered.

### ***Remarks***

Claims 1, 2 & 11-14 are pending examination as discussed below.

### ***Information Disclosure Statement***

The information disclosure statement filed on 9/4/08 has been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

1. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how the second volume is larger than itself. This is being interpreted as a typographical error and that the second volume is larger than the first.

Claims depending from claims rejected under 35 USC 112 are also rejected for the same.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 & 11-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Patent 6,063,515 (Epp).

Epp teaches a method of controlling a fuel cell system where hydrogen-containing gas is produced by a reformer. The hydrogen-containing gas is then sent to a diaphragm module that selective separates out the hydrogen, which is used for the fuel cell. The reformer gas is kept at a higher pressure than the separated hydrogen gas (Abstract; Figs. 1 & 3; 2:30-40, 3:45-67, 7:50-8:5). A pressure sensor is used to control the inlet pressure to the fuel cell to a desired range of 40-80 psi (10:30-40). The oxidant side pressure is also operated at a desired range of 40-80 psi (10:45-55). Since

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the fuel cell is taken to operate in the manner intended, then if the hydrogen separation diaphragm breaks, the pumps would control the pressure differential such that the pressure between the membrane electrode assembly would be kept below a predefined value that wouldn't cause damage to the membrane electrode assembly. Furthermore, a pressure differential between the anode and the cathode side of the fuel cell is held below a predefined value as determined by the difference between the operating pressure of the reformer and the operating pressure of the cathode inlet. In this case, the pressure would be held below a pressure difference of 300 psi (400 psi for the reformer minus 100 psi for the operating pressure of the fuel cell).

Regarding claims 12-14, since  $P_1V_1=P_2V_2$  the first volume is smaller than the second volume. The pressure differences of 400-600 psi on the first side and 40-100 psi on the second side equate to a volume difference of between 6 - 8 times.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,063,515 (Epp).

The teachings of Epp as discussed above are incorporated herein. Epp is silent to keeping the pressure differential below 500 mbar.

The operating pressure of the oxidant and the fuel supplied to the fuel cell is between 40 and 80 psi (10:30-55). A pressure sensor and purge valve is located in the anode fuel supply loop and the pressure sensor is used to maintain the hydrogen pressure between 40 and 80 psi. It is well known in the art to keep the pressure difference between the anode side and cathode side below tolerance levels dependent upon the electrolytic membrane used for the fuel cell. If the pressure difference across the membrane becomes greater than the tolerance level the membrane could develop holes or tears and either decrease the performance of the fuel cell or possible impede the operation of the fuel cell. Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to utilize the pressure sensor, vent and pumps of Epp to keep the pressure differential between the anode and the cathode below a pressure that would damage the particular membrane electrode assembly, such a pressure difference including zero.

4. Claims 1, 2 & 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,063,515 (Epp) in view of JP 60-007065 (Hiroshi).

The teachings of Epp as discussed above are incorporated herein.

Epp is silent to actively keeping the pressure difference between the anode and the cathode below a predetermined value, where the value is below 500 mbar.

Hiroshi teaches a fuel cell system that controls the pressure difference between the anode and the oxidant gases, thereby operating the fuel cell in a safe manner (Abstract). An exhaust valve is opened on the high pressure side to relieve the

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difference. While the difference is not expressly taught, the claimed range includes zero and therefore it would be obvious to one skilled in the art to keep the pressure difference to zero to ensure operating the fuel cell in a safe manner.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the fuel cell operation of Epp with the pressure balancing between the anode and the cathode of Hiroshi to ensure the safe operation of the fuel cell and longevity of the membrane.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,063,515 (Epp) in view of US 6,815,107 (Inai).

The teachings of Epp as discussed above are incorporated herein.

Epp is silent to keeping the pressure differential below 500 mbar.

Inai teaches a fuel cell system where the pressure difference between the anode side and cathode side of the electrolyte membrane is below 40 kPa. Keeping the pressure difference below this prevents damage to the electrolyte membrane (10:30-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the control of Epp's fuel cell with the pressure difference of less than 40 kPa as taught by Inai in order to prevent damage to the electrolyte membrane.

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6. Claims 1, 2 & 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,063,515 (Epp) in view of JP 60-007065 (Hiroshi) and US 6,815,107 (Inai).

The teachings of Epp, Hiroshi and Inai as discussed above are incorporated herein.

Epp is silent to keeping the pressure differential below 500 mbar.

Inai teaches a fuel cell system where the pressure difference between the anode side and cathode side of the electrolyte membrane is below 40 kPa. Keeping the pressure difference below this prevents damage to the electrolyte membrane (10:30-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the control of Epp's fuel cell with the pressure difference of less than 40 kPa as taught by Inai in order to prevent damage to the electrolyte membrane.

### ***Response to Arguments***

Applicant's arguments filed 9/4/08 have been fully considered but they are not persuasive. Regarding the arguments against claim 1 and the prior art of Epp, applicant has not provided any evidence that the fuel cell would not operate in the manner disclosed and therefore would keep the pressure of the anode gas at 40-80 psi as taught if the membrane burst. Furthermore, applicant has provided no evidence that the pressure difference taught would damage the electrolytic membrane.



Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection as required by amendment.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 2001/0016276 (Yamanashi).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEITH WALKER whose telephone number is (571)272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner, Art Unit 1795